

DESCRIPTIONS OF TWO NEW SPECIES OF POLYCHÆTA FROM WOOD'S HOLE, MASSACHUSETTS.

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Nereis arenaceodentata n. sp.

A small, slender species, seldom exceeding an inch in length. The head (Pl. XL, fig. 1) is about as long as broad, roughly quadrate, with the posterior side about $1\frac{1}{2}$ times the anterior, which is strongly convex, the lateral borders bulging posteriorly, excavated and wrinkled anteriorly. The two pairs of conspicuous, black, broadly elliptical eyes are almost in contact near the postero-lateral angles of the head; the anterior somewhat more widely separated and slightly the larger. Frontal tentacles about $\frac{2}{5}$ head, slender, conical, divergent; their bases separated by about twice their diameter. Palps thick, swollen at the base, conical but suddenly constricted and bent at the terminal third; the style minute and retracted but reaching beyond the frontal tentacles. Tentacular cirri all relatively short and moderately slender, with very short crowded basal pieces; the anterior dorsal is about equal to the head; the anterior ventral about $\frac{3}{4}$, the posterior dorsal about twice and the posterior ventral about $\frac{3}{5}$ as long. The buccal region is swollen and wrinkled.

At the anterior end a region of the body comprising the first 4 or 5 somites is considerably enlarged and quite terete; the body then rapidly narrows to about somite X, beyond which it is nearly linear and of uniform diameter to near the caudal end. At first the parapodia are small, but increase in length as the width of the body diminishes, so that the total width remains nearly uniform. Beyond the first third the length of the parapodia equals the width of the body and the animal assumes a depressed aspect. The caudal end terminates quite abruptly in a short pygidium bearing a pair of anal styles equal in length to the last 8 or 9 segments. There are 49 setigerous somites in the type.

The parapodia are all distinctly biramous. In the first (fig. 2) the notopodium is relatively small and simple and is achætous and lacks an aciculum; it consists of a short cylindrical base bearing a single conical lobe, and an equally long, but more slender, dorsal cirrus. The neuropodium is larger, contains an aciculum and bears setæ;

besides a short, thick, blunt acicular lobe it bears a posterior and a ventral lobe, both of which are bluntly conical and have their free portions subequal. The ventral cirrus, borne at the base of the neuropodium, is rather thick with a constricted base, and reaches the tip of the acicular lobe.

The next two or three parapodia change quickly, and by the fifth (fig. 3) the typical form is attained. The bases of both rami are longer and deeper, and in the neuropodium the posterior lobe has lengthened so that it reaches distinctly beyond the ventral lobe; both lobes are more pointed. The notopodium exceeds the neuropodium in size and complexity, having a short, posterior acicular lobe and three pointed conical processes, of which the dorsal is the largest, the ventral as long but more slender, and the anterior, which lies immediately before the fascicle of setæ, much the smallest. The slender dorsal cirrus is nearly as long as the dorsal lobe, from just within the base of which it arises.

In succeeding parapodia, besides a general increase in size many changes in proportion of parts take place. The two rami become more elongated and crowded together, as shown in the thirtieth parapodium (fig. 4). Here both dorsal and ventral cirri have become much more slender and reduced to a length of $\frac{1}{3}$ or $\frac{1}{4}$ of the parapodium, and the former is carried much farther out than in preceding somites; the neuropodial acicular lobe is very prominent, with a distinct presetal process and bears the posterior lobe as a postsetal process, while the ventral lobe has undergone little alteration beyond being more pointed. The notopodium is nearly twice as deep as the neuropodium, beyond which it also extends; the largely developed acicular lobe bears the pointed, now subequal, anterior and ventral lobes as presetal processes; the dorsal lobe stands more apart as a broad, triangular, somewhat flattened piece. Still farther caudad all of the lobes shrink in size and become elevated on a longer basal region.

Except the notopodium of the first, each ramus of every parapodium contains a single aciculum which is simple, slender, tapering and colorless.

There are two kinds of setæ, both having rather slender, slightly curved, transparent, colorless and camerated shafts. In one form (fig. 8) the blades are very long, slender and acute, especially in the middle region of the body, with one margin delicately fringed; the shafts, as compared with the other kind, are longer, more slender and have the margins of the socket of nearly equal height all around. The other form (fig. 7) has the shaft somewhat stouter and more curved, the end

more distinctly enlarged and the margin of the socket very oblique; the appendage is never more than $\frac{1}{2}$ as long as in the first kind, and is usually $\frac{1}{3}$ or $\frac{1}{4}$ as long, is more distinctly fringed and terminates abruptly in a rather coarse hook. The entire seta is less than or only equal to the shaft alone of the first kind.

The short setæ occur in both notopodium and neuropodium and in both dorsal and ventral fascicles of the latter. The first parapodium lacks notopodial setæ altogether and only 1 to 3 of this kind are found in the neuropodium. In the notopodium of the fifth 5 or 6 occur, and in the neuropodium there are 3 or 4 in the dorsal part of each fascicle. Toward the middle of the body the number increases, the twentieth parapodium supporting about 30 in a spreading fan-shaped notopodial bundle and 6 to 8 in the dorsal part of each neuropodial fascicle. The thirtieth foot shows a slightly increased number, which by the fortieth has fallen to about 8 in each ramus. The second form of seta is restricted to the neuropodium, the dorsal bundle of which contains from 3 to 5 and the ventral bundle from 12 to 20 in the first thirty parapodia, while the single bundle of the fortieth contains but 3 altogether.

There is nothing characteristic about the jaws, which have the usual brown color and curved form with a broad base, acute terminal fang and 6 or 7 smaller teeth. The paragnatha (figs. 5 and 6) are very characteristic. All of the areas of the basal ring have united into a continuous zone somewhat narrower on the dorsum, covered thickly and uniformly with small, grainlike, bluntly conical, horny papillæ (fig. 9), measuring from .03 mm. to .04 mm. in height and the same in diameter. On the maxillary ring the usual six areas are distinctly differentiated. The paragnatha of the 3 dorsal areas especially are distinctly coarser and more elevated (fig. 10), those of the most anterior rows being largest and strongly hooked. The median dorsal area has the form of an ellipse, about twice as wide as long and formed of about six transverse rows of about six each, except at the ends. The dorso-lateral areas are narrowly crescentic, composed of few paragnaths, but the anterior ones the largest and most strongly hooked of all. The median ventral is nearly circular, composed of numerous small paragnaths similar to those of the basal row and arranged in curved transverse rows. Finally the ventro-lateral areas are drop-shaped with the base toward the jaws and a slender pointed tail. None of the specimens had the proboscis protruded and the arrangement of the paragnatha had to be determined by dissection. Some allowance must therefore be made for distortion of the form of the areas on the folded surface.

The type specimen is 22 mm. long, 2.3 mm. between the tips of the parapodia without setæ and .7 mm. in width of body in the middle region.

The small size of the species might lead to the belief that it is an immature phase of another species, but any doubt as to its distinctness is dispelled by the presence of large numbers of mature ova in the coelom of many specimens. The species occurs occasionally on mussel beds just below low water and was found quite commonly during the latter part of August, both of 1902 and 1903, swimming at the surface of Wood's Hole harbor with other species of sexually mature nereids and syllids.

Loimia viridis n. sp.

In the preserved state the body is rather slender and regularly tapering, the thoracic region passing easily into the abdominal without any sudden diminution in size, though the former is circular in cross-section, the latter flattened below and highly arched above. The first thirteen somites are smooth and not annulated, the remaining thoracic and first two abdominal (which are longer than the succeeding ones) strongly but somewhat irregularly subdivided. Apparently there are three primary annuli, the middle one of which bears the parapodia and an irregular zone of sense organs. Each is divided into two or three very short, often incomplete annuli. This condition passes gradually into the typical biannulate arrangement of the middle abdominal somites, in which a somewhat larger posterior annulus bears the parapodia and sensory zone. Toward the caudal end the somites become very short and simple. The anus is small and surrounded by four very short papillæ.

There are nine ventral plates, the first corresponding to somites II to V, the limits of which are indicated by faint grooves, and extending high upon the sides. Successive plates become gradually narrower and longer, the second being three times as wide as long, while the eighth is as long as the width of its anterior and one and one-half times its posterior end. The ninth is narrow, transversely wrinkled and ends opposite the middle of somite XIII. All of the ninth and the posterior half of the eighth are highly vascular. Dorsad of the ventral plates on each side is a whitish, thickened glandular area anteriorly including the bases of the branchiæ and nearly meeting on the dorsum. Posterior to the branchiæ they quickly become narrowed and restricted to the region of the parapodia and disappear altogether at about XII or XIII.

The prostomium surrounds the mouth completely and consists of a

broad, flat, smooth dorsal lobe projecting prominently over the mouth, and much shorter thin lobes on each side which meet in the middle line below and join the peristomium by a narrow isthmus. Tentacles numerous but small, borne on rather restricted areas which meet in the middle line and extend on each side of the posterior part of the prostomium. In the preserved specimen the length of the tentacles is less than the diameter of the branchial region. They are attached by contracted bases in the same manner as Andrews has described for *L. turgida*. There is no post-tentacular fold and no eyes.

The peristomium is largely retracted within the free margin of the first ventral plate, from which it projects as a pair of thin lobes which widen dorsally and conceal the ventral limb of the prostomium; on the dorsal side the peristomium is scarcely recognizable.

Three pairs of branchiæ occur on somites II, III and IV; the first is very large, with a length exceeding the diameter of the body at that point, while the third is scarcely one-fifth as long. They are tall arboriform, each with a stout, tapering, irregularly bent stem bearing irregularly alternate branches (5 on the 3d to 11 on the 1st), each of which again divides in the same irregular manner 3 or 4 times, resulting in very numerous, fine and densely tufted terminal twigs.

The first parapodium is merely a setigerous tubercle just beneath the third branchia. The remaining thoracic ones have rather prominent dorsal setigerous tubercles and uncigerous tori which are at first short, but increase in length and shift ventrad as the ventral plates diminish in size; posterior to the region of the ventral plates these tori become more elevated and nearly meet in the ventral mid-line. The abdominal uncigerous tori are truncate, flattened tubercles projecting caudad from the posterior margin of the somites on the ventro-lateral angle, the caudal members of the series becoming minute.

The setæ (fig. 11) of each tuft are arranged in two vertical rows, one composed of more slender, the other of stouter setæ. The former are nearly colorless, slightly curved, axially faintly striated and have a very narrow marginal wing. The latter are yellowish, nearly straight, rapidly tapering in the exposed part, doubly winged, both wings being obliquely striated and one much wider, the core strongly marked with parallel longitudinal striations and the superficial fibers radiating in all directions to the surface which, as a consequence, has the appearance of being regularly marked with rows of fine granules or very short lines.

On somites XI to XX the uncini are in two rows, on V to X inclusive and caudad of XX in but one row. On the posterior thoracic somites

they are very numerous, each torus of somite XX, for example, containing upward of 400, while on XXI, the first abdominal somite, there are but 80. As usual in the genus, they have the form of flat pectinate plates (figs. 12, 13 and 14) set on edge in the integument with the curved teeth exposed, but they are broader apically than in most species and usually have 6 well-developed teeth, the apical one the smallest and occasionally absent, the basal one much the stoutest, the base strongly convex with a prominent posterior process and a small tubercle usually present beneath the lowermost tooth.

The total length of the type is 107 mm., width in the branchial region 7.5 mm., width at somite XXI 4 mm., number of somites 92, of which 20 are thoracic and 72 abdominal; somites V to XX are setigerous and uncini are present on all somites beginning with V.

The color when living is olive-green, purest in the posterior region, becoming lighter and more or less tinged with red or yellow anteriorly as a result of the blood-vessels showing through the integument. The tori, particularly on the somites bearing capillary setæ, are greenish-yellow edged with a narrow red blood-vessel which forms a red spot dorsad of the fascicles of setæ. The ventral plates are yellowish or olive-buff with the prominent anterior border pale green and the furrows and a narrow lateral edging blood-red, while a deep red clot-like spot covers a narrow area extending over the middle ventral portion of somites XII, XIII and XIV, from which a distinct red line marks the course of a subneural vessel to XXI. The lower lip is green, the upper red, the tentacles pale pink. The branchiæ have red stalks with green or white branches.

From most of the nine undoubted species of the genus which have been described from various parts of the world *L. viridis* is distinguished by its color. From *L. turgida* Andrews, the only species hitherto taken on the Atlantic coast of the United States, the shape of the uncini and the absence of dark pigmented rings on the tentacles afford the best distinctions.

The only example of this species known was found by Mr. George Gray burrowing in a soil of sandy mud with *Amphitrite ornata* below low water at Ram Island, Wood's Hole, on August 4, 1902. Repeated search since then has failed to bring any additional specimens to light, and as it is a very conspicuous species it must be quite rare or inhabit some locality hitherto unexplored. When brought to me this example occupied a thick mud tube nearly indistinguishable from that of *Amphitrite*.

The types of these two species are in the collection of this Academy.

EXPLANATION OF PLATE XL.

Nereis arenaceodentata.

- Fig. 1.—Dorsal view of anterior end. $\times 32$.
Figs. 2, 3 and 4.—Outlines without setæ of the 1st, 5th and 30th parapodia respectively, from cephalic side. $\times 56$.
Figs. 5 and 6.—Dorsal and ventral aspects respectively of protruded proboscis, showing the arrangement of the paragnatha; from a dissection. $\times 32$.
Figs. 7 and 8.—Examples of the two kinds of setæ, from somite XX. $\times 1200$. Many of the stouter sort have the appendage much shorter.
Fig. 9.—Several of the paragnatha from the basal zone. $\times 360$.
Fig. 10.—The same from the median dorsal maxillary area. $\times 360$.

Loimia viridis.

- Fig. 11.—One of the stouter setæ from somite X. $\times 250$. These setæ are seldom so straight as represented in the drawing, which has been somewhat diagrammatized from a camera sketch.
Figs. 12, 13 and 14.—Three uncini from the dorsal, middle and ventral regions respectively, of a torus of somite XXVI. $\times 360$. These show nearly the extremes of variation, figure 13 being the most usual form, but slightly foreshortened.